Plug-in Signal Conditioners K-UNIT

FREQUENCY TRANSMITTER

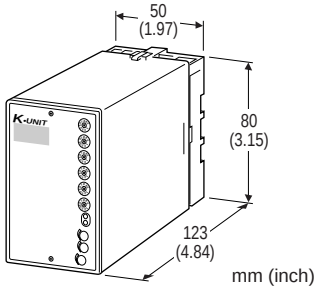
(field-configurable)

Functions & Features

• Converting the output from a pulse-type transducer into a standard process signal
• Open collector, mechanical contact, proximity sensor, voltage pulse and 2-wire current pulse inputs
• Output decreases gradually with no input
• Excitation
• Isolation up to 2000 V AC
• High-density mounting

Typical Applications

• Averaging non-uniform pulses from positive displacement flowmeter to provide a stable output
• Positive displacement flowmeters, turbine flowmeters and vortex flowmeters
• Measuring rotation speed of a machine generating dry contact signals



CE

MODEL: KPAU-[1][2][3]-[4][5]

ORDERING INFORMATION

• Code number: KPAU-[1][2][3]-[4][5]
Specify a code from below for each of [1] through [5].
(e.g. KPAU-A1LA-B/Q)
• Special output range (For codes Z & 0)
• Specify the specification for option code /Q
(e.g. /C01/S01/SET)

[1] INPUT

A1: Open collector
A2: Mechanical contact
B1: Proximity sensor
B2: Voltage pulse
H: Two-wire current pulse

[2] EXCITATION

L: 12 V DC / 40 mA
M: 24 V DC / 25 mA

[3] OUTPUT

Current
A: 4 – 20 mA DC (Load resistance 750 Ω max.)
B: 2 – 10 mA DC (Load resistance 1500 Ω max.)
C: 1 – 5 mA DC (Load resistance 3000 Ω max.)
D: 0 – 20 mA DC (Load resistance 750 Ω max.)
E: 0 – 16 mA DC (Load resistance 900 Ω max.)
F: 0 – 10 mA DC (Load resistance 1500 Ω max.)
G: 0 – 1 mA DC (Load resistance 15 kΩ max.)
Z: Specify current (See OUTPUT SPECIFICATIONS)
Voltage
1: 0 – 10 mV DC (Load resistance 10 kΩ min.)
2: 0 – 100 mV DC (Load resistance 100 kΩ min.)
3: 0 – 1 V DC (Load resistance 100 Ω min.)
4: 0 – 10 V DC (Load resistance 1000 Ω min.)
5: 0 – 5 V DC (Load resistance 500 Ω min.)
6: 1 – 5 V DC (Load resistance 500 Ω min.)
4W: -10 – +10 V DC (Load resistance 2000 Ω min.)
5W: -5 – +5 V DC (Load resistance 1000 Ω min.)
0: Specify voltage (See OUTPUT SPECIFICATIONS)

[4] POWER INPUT

AC Power
B: 100 V AC
C: 110 V AC
D: 115 V AC
F: 120 V AC
G: 200 V AC
H: 220 V AC
J: 240 V AC
DC Power
S: 12 V DC
R: 24 V DC

[5] OPTIONS

blank: none
/Q: With options (specify the specification)

SPECIFICATIONS OF OPTION: Q (multiple selections)

COATING (For the detail, refer to our web site.)
/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating
TERMINAL SCREW MATERIAL
/S01: Stainless steel
EX-FACTORY SETTING

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/SET: Preset according to the Ordering Information Sheet (No. ESU-3590)

GENERAL SPECIFICATIONS

Construction: Plug-in
Connection: M3.5 screw terminals
Screw terminal: Chromated steel (standard) or stainless steel
Housing material: Flame-resistant resin (black)
Isolation: Input to output to power
Overrange output: 0 to 120 % (approx.) at 1 – 5 V
Zero adjustment: -5 to +5 % (front)
Span adjustment: 95 to 105 % (front)
Chattering protection: Filter provided for mechanical contact input (time constant: 1 msec.)
Input monitor LED: Red LED blinks according to the input.
Status indicator: Green LED turns ON in normal operating conditions.
Input pulse sensing: DC coupled
Frequency adjustments: Rotary switches (front)
Non-uniform pulse compensation: Input pulses divided and then multiplied for stabilizing the output; dividing factor adjustable with the front rotary switches (1/1 – 1/ 16, factory default 1/1)
Damper: Time constant adjustable within 0 to 5 sec. (factory default 0 sec.) to provide a first order lag output

INPUT SPECIFICATIONS

Excitation: Shortcircuit protection;
12 V DC @ 40 mA (approx. 43 mA at shortcircuit)
or 24 V DC @ 25 mA (approx. 33 mA at shortcircuit)

■ **Open Collector**
Frequency range: 0 – 1 mHz through 99.99 kHz
(If not specified the default value is used: 0 - 9.999 kHz)
Pulse width time requirement: 4 µsec. min.
Detecting level:
Excitation 12 V
Sensing: 12 V / 1.5 mA
ON/OFF level
ON: ≤ 0.8 kΩ / 1.0 V
OFF: ≥1.7 kΩ / 2.5 V
Excitation 24 V
Sensing: 24 V / 3 mA
ON/OFF level
ON: ≤ 0.35 kΩ / 1.0 V
OFF: ≥ 0.8 kΩ / 2.5 V

■ **Mechanical Contact**
Frequency range: 0 – 1 mHz through 9.999 Hz
(If not specified the default value is used: 0 - 9.999 Hz)
Pulse width time requirement: 10 msec. min.
Detecting level:
Excitation 12 V
Sensing: 12 V / 1.5 mA
ON/OFF level
ON: ≤ 0.8 kΩ / 1.0 V
OFF: ≥1.7 kΩ / 2.5 V
Excitation 24 V
Sensing: 24 V / 3 mA
ON/OFF level
ON: ≤ 0.35 kΩ / 1.0 V
OFF: ≥ 0.8 kΩ / 2.5 V

■ **Proximity Sensor**
Frequency range: 0 – 1 mHz through 9.999 kHz
(If not specified the default value is used: 0 - 9.999 kHz)
Pulse width time requirement: ≥ 20 µsec.
Waveform: Square or sinusoidal
Detecting level: Input voltage ±50 V (±30 V to conform with EU Directive)
≤ 0 mV for Lo, ≥ 150 mV for Hi
Input impedance: ≥ 20 kΩ

■**Voltage Pulse**
Frequency range: 0 – 1 mHz through 99.99 kHz
(If not specified the default value is used: 0 - 9.999 kHz)
Pulse width time requirement: ≥ 4 µsec.
Waveform: Square or sinusoidal
Detecting level: Input voltage ±50 V (±30 V to conform with EU Directive)
≤ 1 V DC for Lo, ≥ 2 V DC for Hi
Input impedance: ≥ 20 kΩ

■ **Two-wire Current Pulse**
Frequency range: 0 – 1 mHz through 99.99 Hz
(If not specified the default value is used: 0 - 99.99 Hz)
Pulse width time requirement: ≥ 10 msec.
Input resistance: 200 Ω
Input range: 0 – 30 mA
Detecting level: ≤ 5 mA for Lo, ≥ 10 mA for Hi

OUTPUT SPECIFICATIONS

■ **DC Current**: 0 – 20 mA DC
Minimum span: 1 mA
Offset: Max. 1.5 times span
Load resistance: Output drive 15 V max.
■ **DC Voltage**: -10 – +12 V DC
Minimum span: 5 mV
Offset: Max. 1.5 times span
Load resistance: Output drive 10 mA max.; 5 mA for negative voltage output; at ≥ 0.5 V

INSTALLATION

Power input
•**AC**: Operational voltage range: rating ±10 %, 50/60 ±2 Hz, approx. 4 VA

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•**DC**: Operational voltage range: rating ±10 %,
ripple 10% p-p max.; approx. 2.5 W (100 mA at 24 V)
Operating temperature: -5 to +55°C (23 to 131°F)
Operating humidity: 30 to 90 %RH (non-condensing)
Mounting: Surface or DIN rail
Weight: 350 g (0.77 lb)

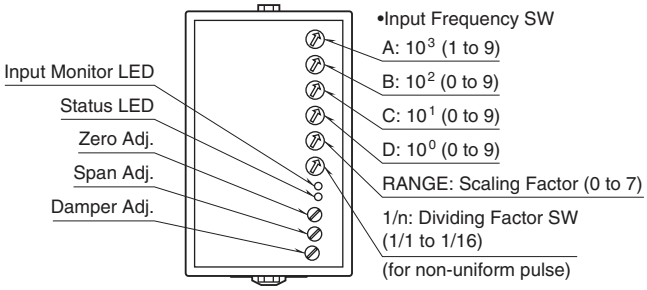
PERFORMANCE in percentage of span

Accuracy: ±0.1 %
Temp. coefficient: ±0.015 %/°C (±0.008 %/°F)
Response time: ≤ 0.5 sec. + one pulse cycle (0 – 90 %; with damper set to 0 sec.)
Line voltage effect: ±0.1 % over voltage range
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 2000 V AC @1 minute (input to output to power to ground)

STANDARDS & APPROVALS

EU conformity:
EMC Directive
EMI EN 61000-6-4
EMS EN 61000-6-2
Low Voltage Directive
EN 61010-1
Installation Category II
Pollution Degree 2
Input or output to power: Reinforced insulation (300 V)
Input to output: Basic insulation (300 V)
RoHS Directive

EXTERNAL VIEW



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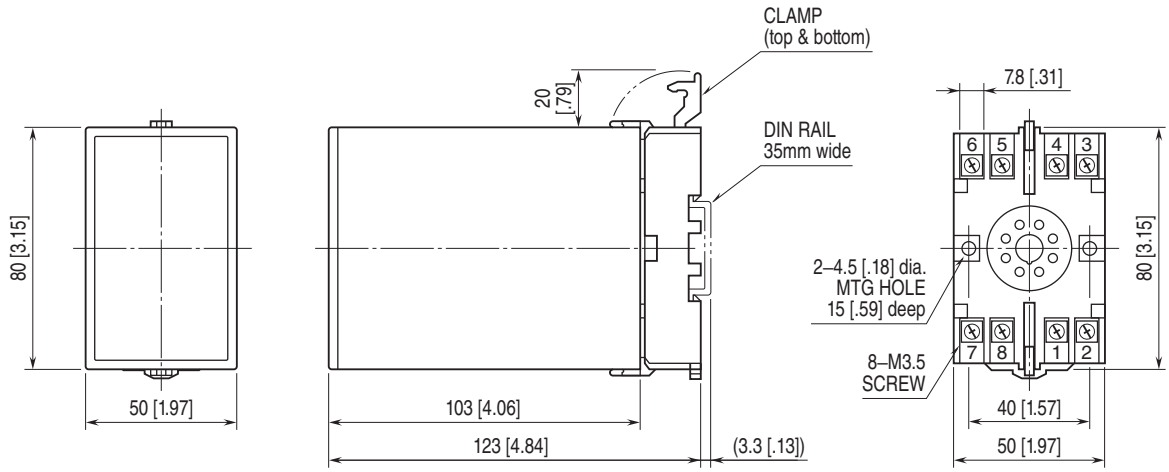
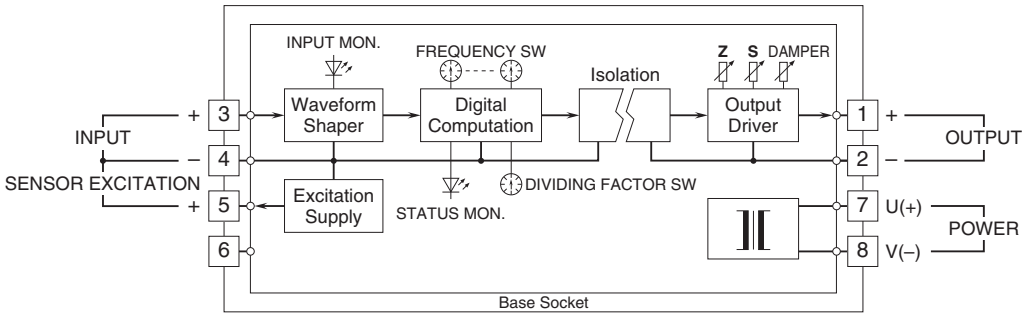
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



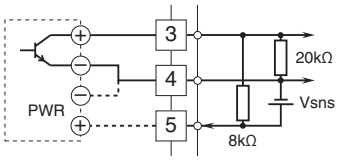
• When mounting, no extra space is needed between units.

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

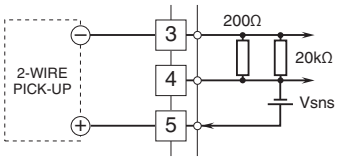


Input Connection Examples

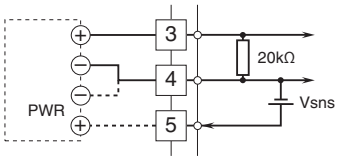
■ **Open Collector or Mechanical Contact**



■ **2-Wire Current Pulse**



■ **Voltage Pulse or Proximity Sensor**



⚠ Specifications are subject to change without notice.

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